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Sibiu Innovation Days

24-25 October, Sibiu - RO



# Innovation through Blockchain: Pioneering Applications Across Sectors

How Blockchain Technology is Transforming Industries

Radu Chis – Head of Technology @ MultiversX

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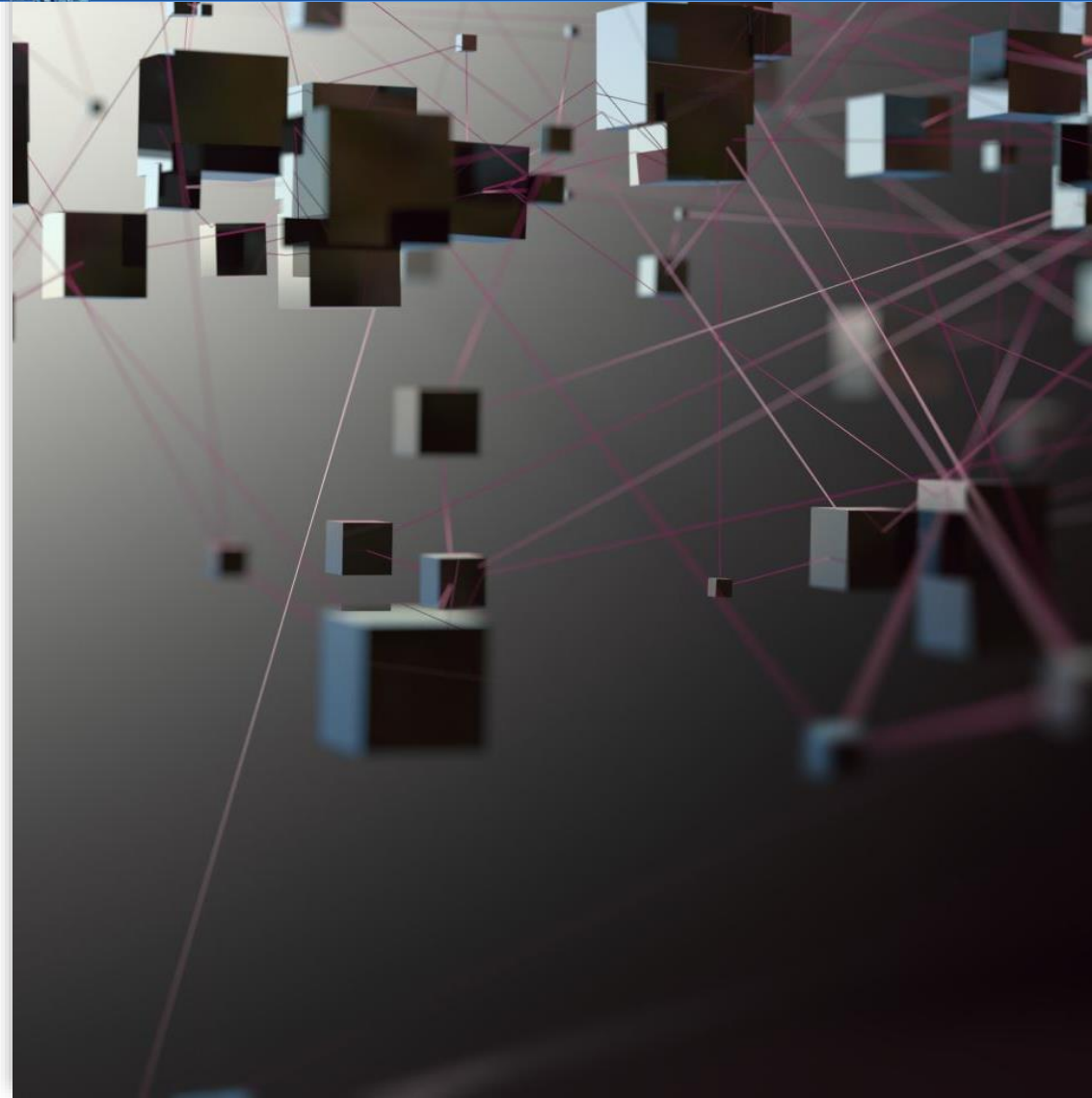
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# Understanding Blockchain

- What is Blockchain?
  - A decentralized ledger technology
- The Rise of Blockchain
  - From Bitcoin to diverse applications
- Why Blockchain Matters
  - Transparency, security, and efficiency



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## Key Features of Blockchain vs Databases



### Decentralization

No central authority  
controls the data

Less Corruption



### Immutability

Once recorded, data  
cannot be altered

Audit Trail



### Transparency

Transactions are visible to  
all participants

Foster trust



### Security

Cryptographic techniques  
protect data

Unauthorized access

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# Blockchain and Artificial Intelligence (AI)



## Synergy Between Blockchain and AI

- Secure data sharing for AI models
- Enhanced trust and transparency in AI decisions
- New type of computer: Truth Machine



## Decentralized AI Networks

- Distributed AI training on blockchain
- Data privacy and ownership control

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# Applications of Blockchain and AI



## Secure Data Sharing

Blockchain ensures data  
integrity for AI

Authentic and Untampered



## Data Monetization

Individuals control and profit  
from their data

Receive Compensation



## Enhanced AI Ethics

Transparent and explainable  
AI models

Audit



## Autonomous Systems

Secure operation of IoT  
devices and robots

Reduce tampering

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## Benefits of Combining Blockchain and AI

- Improved Data Security
  - Protecting against data breaches
- Greater Data Availability
  - Access to diverse datasets securely
- Cost Efficiency
  - Reducing intermediaries in data processing
- Innovation Acceleration
  - Enabling new business models and services



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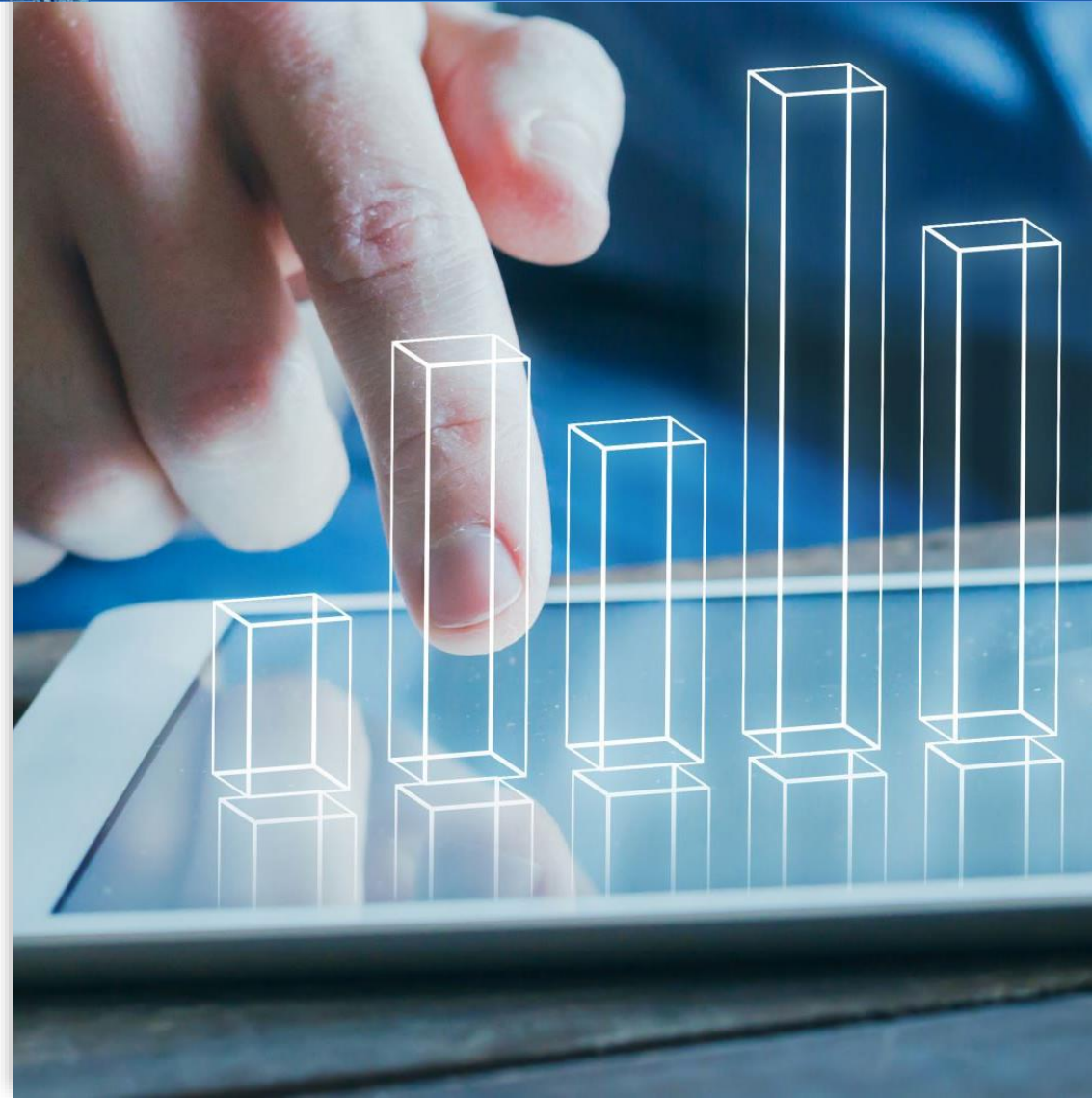
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## Challenges and Considerations

- Scalability Issues for real time AI apps
  - Blockchain transaction speeds
- Data Quality
  - Ensuring accurate data for AI
- Regulatory Compliance
  - Navigating data protection laws - GDPR
- Technical Complexity
  - Integrating two advanced technologies
  - Require expertise and infrastructure



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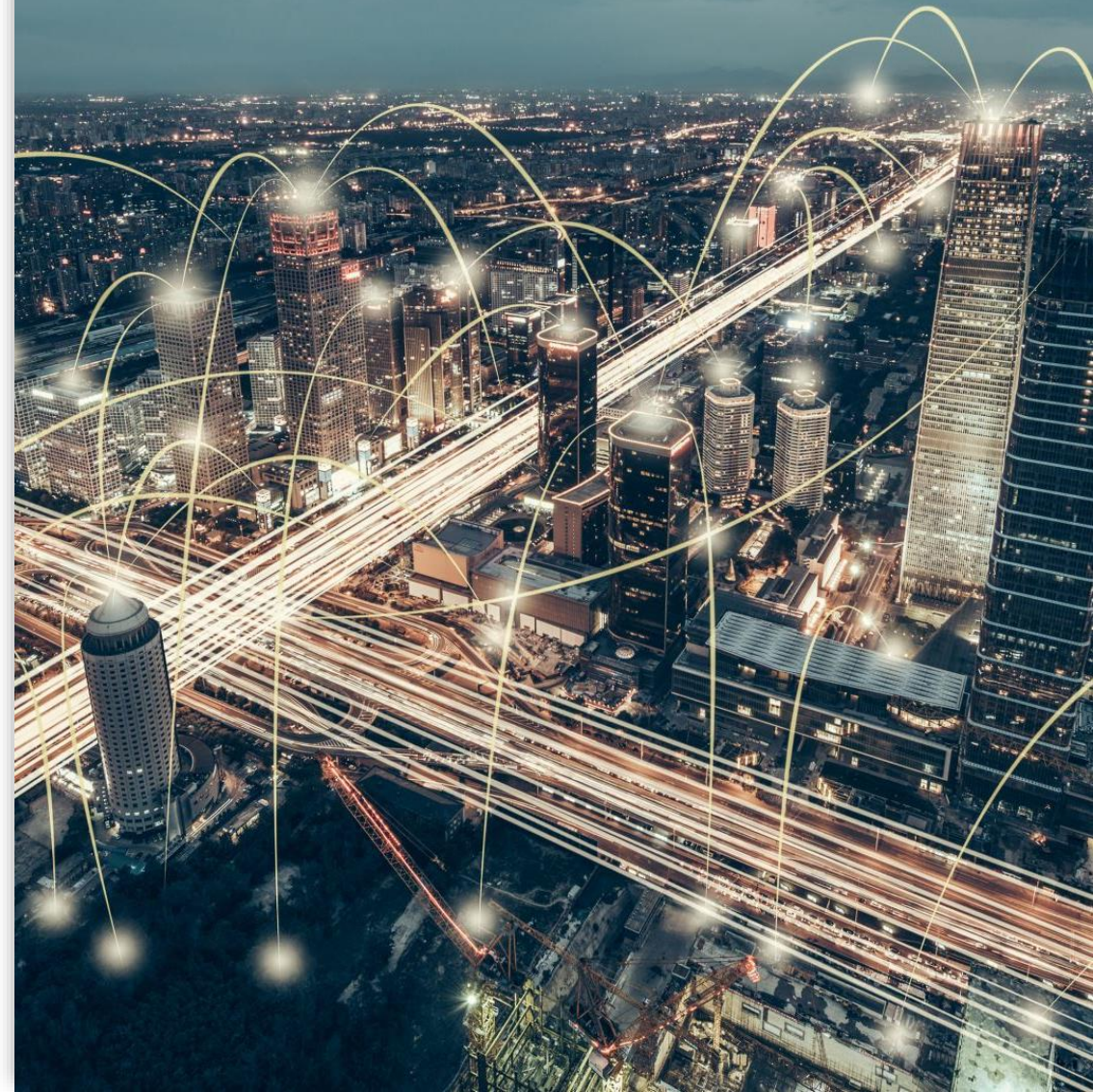
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## Case Studies - AI

- Healthcare Data Management
  - Secure patient data for AI diagnostics
  - Disease detection maintaining privacy
- Supply Chain Optimization
  - AI algorithms improving blockchain-tracked logistics
- Financial Services
  - Fraud detection using AI on blockchain data





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## Financial Services Revolution

- Cryptocurrencies
  - Digital assets like Bitcoin and Ethereum
- Decentralized Finance (DeFi)
  - Financial services without intermediaries
  - Lending and Borrowing without a bank
- Smart Contracts
  - Automated agreements executing terms
  - No middlemen increasing efficiency



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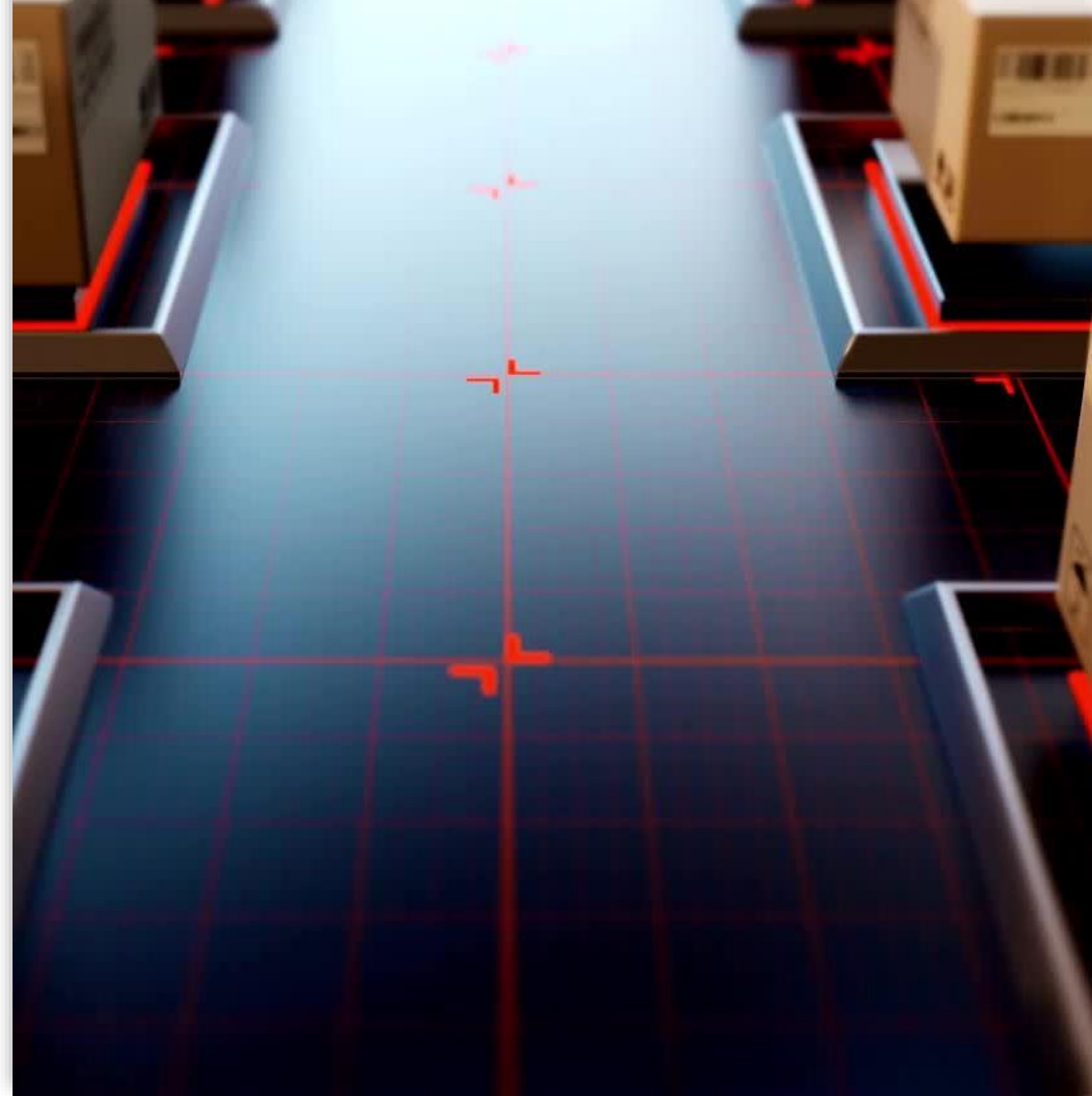
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## Supply Chain Management

- Enhanced Traceability
  - Track products from origin to consumer
  - Pharmaceuticals & luxury goods
- Fraud Reduction
  - Authenticity verification of goods
- Efficiency Gains
  - Streamlined operations and reduced costs



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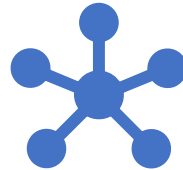


# Healthcare Innovations



## Secure Medical Records

Protecting patient data  
Accessible to authorized personnel



## Interoperability

Seamless data sharing between  
providers



## Drug Supply Chain Integrity

Preventing counterfeit medications  
Tracking from manufacturer to patient

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# Government and Public Sector



## Transparent Voting Systems

Secure and tamper-proof elections



## Identity Management

Decentralized IDs for citizens



## Land Registry

Immutable property records

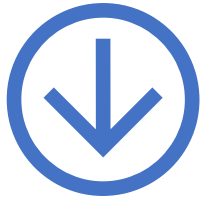
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# Energy and Utilities



## Peer-to-Peer Energy Trading

Direct energy sales between users  
Buy and sell excess energy



## Grid Management

Efficient energy distribution



## Renewable Energy Certificates

Verified green energy production

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# Zero-Knowledge Proofs (ZKPs) Overview



## What are Zero-Knowledge Proofs?

Proving knowledge without revealing  
information



## Importance in Blockchain

Enhancing privacy and scalability



## Types of ZKPs

zk-SNARKs, zk-STARKs

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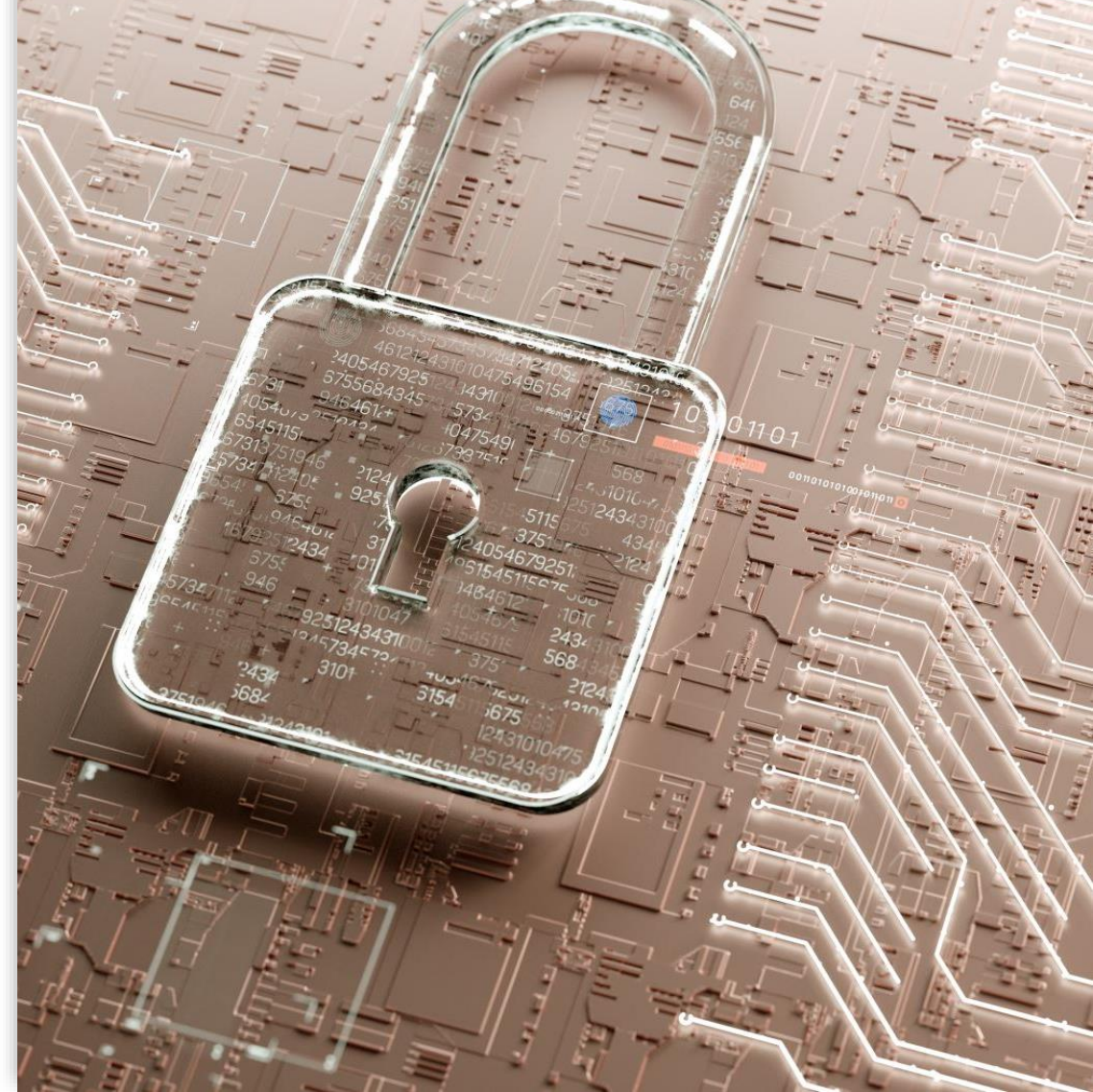
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## Applications of Zero-Knowledge Proofs

- Privacy-Preserving Transactions
  - Concealing transaction details while ensuring validity
- Identity Verification
  - Proving identity without sharing personal data
  - Prove over 18, no age or ID
- Scalability Solutions
  - Off-chain computations with on-chain verification



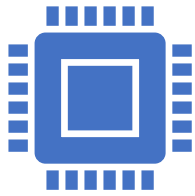
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# Introducing MultiversX



## What is MultiversX?

A high-throughput blockchain  
platform

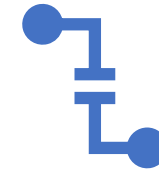
Scalability and efficiency



## Mission and Vision

Scaling blockchain for mass  
adoption

Addressing current limitations



## Core Technologies

Adaptive State Sharding  
Secure Proof of Stake (SPOS)  
Zero Knowledge Proofs  
Sovereign Chains

# MultiversX



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# MultiversX's Innovative Solutions



## Adaptive State Sharding

Enhances scalability through parallel processing



## Secure Proof of Stake (SPoS)

Efficient and secure consensus mechanism



## Sovereign Chains

Customized, interoperable blockchains for enterprises



## Integration of ZKPs

Confidential transactions  
Private smart contracts  
Pushing the boundaries of innovation

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# MultiversX Sovereign Chains



## What are Sovereign Chains?

Independent blockchains with custom  
rules

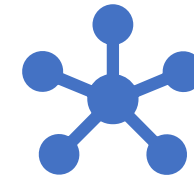
Specific requirements



## Benefits for Enterprises

Tailored solutions meeting specific  
needs

Rules, governance and functionality



## Interoperability

Seamless interaction with the main  
network

Communication to other chains and  
services

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## Usecase: Government ICI

- MultiversX blockchain, NFTs
- NFT Collections
  - David Popovici
- AGERPRESS Daily News – 21 Oct 2024
  - record news on the blockchain



*"In a world dominated by digital challenges, the use of blockchain to guarantee the **authenticity** and **truthfulness** of information is essential. The launch of <Agerpres Daily News | Hold History> is another crucial step in building a safe and well-informed digital ecosystem."*

Mr. Bogdan Ivan, the Minister of Research, Innovation and Digitalization



ICI Bucharest

📅 21.10.2024

ICI Bucharest and AGERPRES launched the  
project "Agerpres Daily News | Hold History"

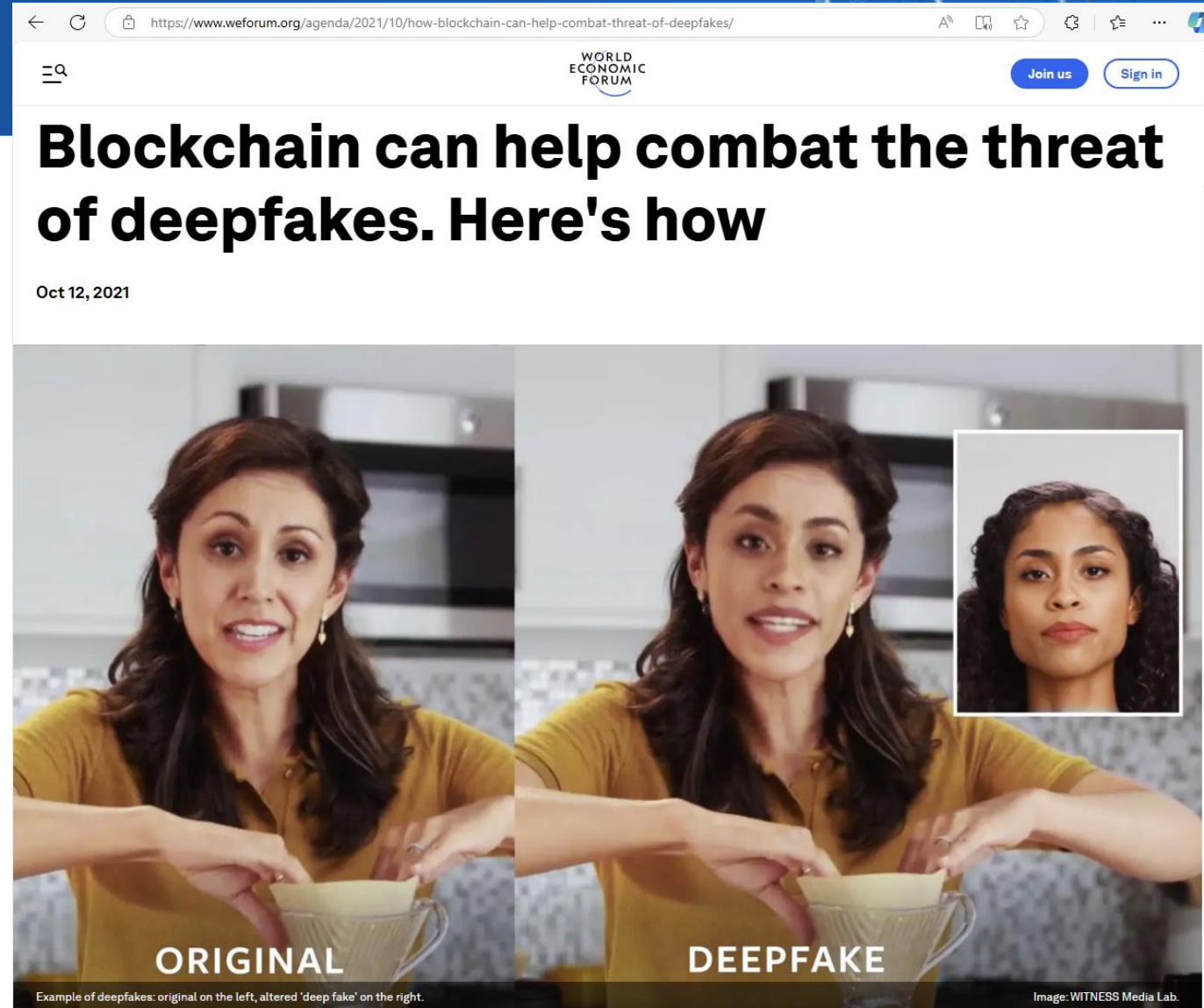
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## Usecase: Deepfakes and AI

- C2PA - Coalition for Content Provenance and Authenticity
  - Adobe, Amazon, Google, Meta, Sony etc
  - technical standards for certifying the source and history (or provenance) of media content
- Blockchain with hardware support
  - authenticity
  - tamperproof




https://www.weforum.org/agenda/2021/10/how-blockchain-can-help-combat-threat-of-deepfakes/

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## Blockchain can help combat the threat of deepfakes. Here's how

Oct 12, 2021



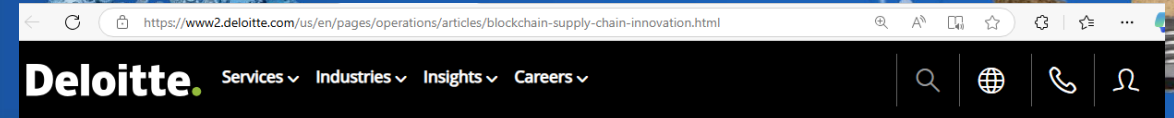
ORIGINAL DEEPPFAKE

Example of deepfakes: original on the left, altered 'deep fake' on the right.

Image: WITNESS Media Lab.

# Usecase: Supply Chain Deloitte

- Components:
  - Hyperledger Fabric
  - Thingstream
    - Real time positioning
  - AWS
- Data recorded on DLT
  - Immutable
  - Tamperproof



Case studies: Three Deloitte-led blockchain projects

Deloitte's world-class Supply Chain practice helps enterprises imagine, deliver, and run their digital supply networks to address tomorrow's challenges and opportunities. This section provides three examples of how Deloitte teams helped clients tackle some of their most complex supply chain issues using blockchain.

## Case 1: Using blockchain and IoT for shipment tracking

### OVERVIEW

Tracking parcels or shipments in real time is possible with modern delivery services; however, data is often tied to a specific company that manages the delivery chain. Valuable insights from collected data often end up in a centralized repository. But that limits their availability for analysis by multiple parties and represents a lost opportunity to optimize the management of the supply chain.

### APPROACH

Deloitte worked with a client to develop real-time shipment tracking. To do that, Deloitte teams brought together a common blockchain platform—Hyperledger Fabric—which underpins Deloitte's supply chain prototype "Track and Trace," together with Thingstream, a real-time positioning tracker, and AWS technology. Strapped on to a pallet, a sensor records the location of a shipment over any GSM network, internationally. By tracking all data on a single ledger, the sender, shipper, and receiver can build a trusted and immutable history of the shipment's life cycle.

### IMPACT

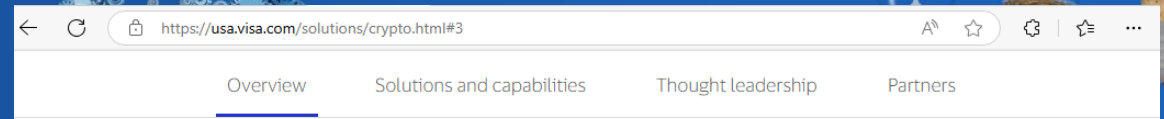
The prototype allows real-time tracking of any object as it is shipped across borders and without the need for human intervention to update its location. Data is recorded immutably on a distributed ledger. And in a network at scale, that prevents a single actor from tampering with any data. This process is the first step in the creation of integrated end-to-end blockchain solutions for supply chains—solutions that can enable greater collaboration between parties and increased transparency throughout the value chain.

## Case 2: A blockchain-based proof of concept focused on simplifying patient consent and biological samples management in clinical trials

## Case 3: Supply chain tracking solution developed on Hyperledger to track medical products across different stages and actors in the clinical supply chain

# Usecase: Financial Services VISA

- VTAP – Visa’s Tokenized Asset Platform
  - Digital payments
  - Fiat-backed tokens
  - Efficient
  - Programmable



## Tap crypto’s potential with a pioneer in global payments

Blockchain networks enable new infrastructure for recording the ownership and transfer of digital assets. We believe that they have the potential to power new applications in capital markets, payments, and commerce.



A leading payment network with 65+ crypto wallet partners



Developing native digital currency settlement on card networks<sup>2</sup>



Innovator in digital currency and blockchain research

## Advancing blockchain based tokenization with Visa Tokenized Asset Platform



**VTAP, Visa's Tokenized Asset Platform, capitalizes on Visa's six-decade legacy in digital payments to offer financial institutions a cutting-edge solution for issuing fiat-backed tokens, enhancing financial efficiency, and enabling programmable finance.**

VTAP can help enable banks to digitize and automate legacy financial practices through smart contracts designed to enhance financial infrastructure to be always on and more efficient:

- [Discover the Evolution](#): [🔗](#) Read our whitepaper on Visa's Journey in Tokenization
- [Connect with us](#): [🔗](#) Get in touch with our team to learn more about VTAP
- [Learn more about specific VTAP Use Cases](#): [🔗](#) Explore our whitepaper on e-HKD
- Learn more about VTAP on the [Visa Developer Platform](#) [🔗](#)

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## Usecase: Zero knowledge

- Prof. Grigore Rosu
  - University of Illinois Urbana-Champaign
- Formal Verification
- Universal verified computing for all

*"Pi Squared (Proof of Proof) enables trustless remote computing, AI, and interoperable smart contracts for any blockchain or dApp."*
- Sovereign Chain

The screenshot shows a web browser displaying the Pi Squared website. The page features a navigation bar with the URL <https://pi2.network/#technology>. The main content area has a purple gradient background and includes the following elements:

- Logo:**  $\pi^2$  Pi Squared
- Headline:** "Our technology is designed for builders"
- Text:** "Our partners build their infrastructure on our technology, creating efficient, trustless connections between chains."
- Workflow Diagram:** A sequence of five steps connected by arrows:
  - Claim  $\varphi$** : Represented by a pencil icon. Below it, text reads: "Alice transfers 1 WETH to Bob. WETH is ERC20 compliant."
  - Mathematical Proof  $\Pi_\varphi$** : Represented by a 'K' icon. Below it, an upward arrow points to a box containing "EVM", "Python", and "..."
  - ZK-ed Proof Checker**: Represented by a grid icon. Below it, two boxes labeled "Huge" and "Precise" are shown.
  - ZK Proof  $\pi_\varphi$** : Represented by a monitor icon. Below it, two boxes labeled "Small" and "Correct" are shown.
- Additional Text:** "ZK-ed matching logic proof checker. Same for all languages and claims! Massively parallel."

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## The Future of Blockchain Innovation

- Emerging Technologies
  - Quantum-resistant cryptography
  - Interoperability solutions
- Industry Collaboration
  - Importance of partnerships and standards
- Adoption Challenges
  - Regulatory hurdles
  - Public perception





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## Conclusion

- Blockchain's Transformative Power
  - Transparency + security + efficiency
  - AI
- MultiversX
  - scalable, secured and customizable solutions for enterprises
- Exploration + adoption of blockchain technologies
- SID Workshop 1:  
4pm-7pm Faculty of Engineering  
***Introduction to Interacting with the MultiversX Network***  
Software Dev: Alexandru Popența



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## Questions and Discussion

- Thank You!

